

# A NEW MIOCENE ECHINOID FROM CALIFORNIA

BY

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Through the kindness of Professor Hubert G. Schenck, of Leland Stanford Junior University, I have been given the opportunity to examine and describe a remarkable spatangoid sea-urchin from California. The specimen is a cast of the interior of the test, *i.e.* an internal mould, and hence shows no tubercles or other characters of the exterior of the animal. But the outlines of the plates both of the ambulacra and interambulacra are well shown and as the specimen is very little damaged or distorted by pressure, a very fair idea of what the species was like in life is obtainable.

At first sight the superficial resemblance to the well-known *Lovenia cordiformis*, now living on the coasts of southern and Lower California, is very striking, but even a cursory examination shows that there is no very close relationship. The total absence of sunken scrobicules in the interambulacra, so conspicuous a feature in *Lovenia*, and the large and much less specialized petals are fundamental differences. As it is not possible to determine anything about the fascioles, since these are recognizable only on the exterior of the test, the family to which this spatangoid belongs must remain uncertain but the general form of the test warrants assigning it to the Spatangidae. There does not seem to be any genus now known to which it can be referred and I am therefore compelled to establish for it

## MEGAPETALUS<sup>1</sup>, gen. nov.

Test relatively long and narrow, and rather high. Oral surface flattened with the peristome only a trifle depressed and with a slight indication of a median keel in interambulacrum 5. Ambulacra petaloid and dorsally very conspicuous; petals very broad, reaching nearly to ambitus, little contracted distally; anterior petal (III) evident but narrower than the others and with its sides more nearly parallel. Ambula-

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<sup>1</sup> μέγας = large + πέταλον = petal, in reference to the large petals.

crum III slightly sunken at the ambitus, but hardly enough so to make the test cordiform. No indication of large tubercles in interambulacra. Abactinal system damaged, so that not even the number of genital pores is determinable. Periproct small, higher than wide, on posterior end of test, not depressed.

GENOTYPE:

*Megapetalus lovenioides*<sup>2</sup> Hubert Lyman Clark, sp. nov.

Plate 31, figs. 1-6

Holotype No. 579, type collection invertebrate paleontology, L. S. J. U., locality 667, (= S.D.S.N.H. locality 164.)

Plastoholotype No. 72, type collection, invertebrate paleontology, S.D.S.N.H.

Test 42 mm. long, 32 mm. wide and 21 mm. high; width is thus about three-fourths of length and height about half. Except for the apex, the specimen is well preserved and not much distorted; as already stated, it is an internal mould, *i.e.* a cast of the interior of the test; hence no fascioles, tubercles, or external ornamentation of any kind are indicated. Apex crushed and damaged so that no apical disk can be made out nor are there any indications of genital pores. Test widest across apex, just back of petals II and IV, narrowing slowly but considerably posteriorly, less so anteriorly; posterior and anterior ends of test are each about 15 mm. wide. Ambulacrum III not sunken at all near apex of test but becoming perceptibly depressed at ambitus and continuing slightly depressed to peristome; the depression at ambitus is a little more than one millimeter.

Petaloid area very large, practically coincident with the aboral surface of test. Petals I and V about 30 mm. long, 9 mm. wide near middle and 7.5 mm. wide at the apparently closed tip which is very near ambitus; interporiferous area is about 3 mm. wide where widest; it is impossible to determine what the relation of petals I and V were proximally but apparently they were not at all confluent but were at least a millimeter apart where they touch the apical system; there are about 35 ambulacral plates on each side of these posterior petals. Petals II and IV, widely divergent, each of them making an angle of approximately 75 degrees with the longitudinal axis of the test; they are each

<sup>2</sup>Lovenia, the well known genus, + ὁμοίης = similar to, in reference to a superficial resemblance to some species of *Lovenia*.

27 mm. long, 8 mm. wide near middle and 7 mm. at the tip which is little if at all closed; there are about 40 ambulacral plates on each side of each petal but half of these are crowded in the proximal 8 mm. where they are very small. Petal III is some 23 mm. long, about 5 mm. wide, with its sides almost parallel; there are about 27 ambulacral plates in each column, but the proximal ones are too crushed and displaced to permit accurate counting.

Interambulacral plates large near ambitus becoming rapidly smaller toward the apical system; in each column there are 6, 7 or possibly 8 but the proximal ones are difficult to make out; those at the ambitus in areas 1 and 4 are 11 mm. wide by 5 mm. high. Periproct vertical on the posterior end of the somewhat truncated test, about 4 mm. high by more than 2 mm. wide, probably just visible from above in the living animal. There is no satisfactory indication of a subanal plastron. Peristome 6 mm. wide and less than 3 mm. long, its anterior margin only 9 mm. from the ambitus in ambulacrum III. Ventral plastron rather long and narrow, distinctly carinate posteriorly.

According to a note from Professor Schenck, this notable fossil was found at "Leland Stanford Junior University locality 667, Santa Paula quadrangle, Ventura County, California, on the divide between Sulphur and Coche Canyons in the formation consisting of chocolate-colored shale and some gray sandstone that overlies Miocene white siliceous shale, commonly referred to as the Modelo Shale, and that underlies lower Pico (Pliocene) conglomerate. The age of the formation carrying the echinoids is regarded as uppermost Miocene, presumably the correlative of the Santa Margarita formation of San Luis Obispo County."

The color of the specimen is a bright orange-brown or rust color.

## PLATE 31

*Megapetalus lovenioides* Hubert Lyman Clark, sp. nov.

All of the figures are approximately natural size and are of the same specimen, Holotype No. 579 of the Stanford University collection of invertebrate paleontology, collected at L.S.J.U. locality 667 (= S.D.S.N.H. locality 164), between Coche and Sulphur Canyons, Santa Paula Quadrangle, Ventura County, California, approximate latitude  $34^{\circ} 23'$  north, longitude  $119^{\circ} 14' 30''$  west. The holotype was obtained from upper Miocene sandstone interbedded with chocolate-brown shale. The matrix obscures the exact outline of the test in Figs. 1, 3, and 4, and details of the actinal surface in Fig. 6 are hidden by the sandstone.

Fig. 1 is a posterior view of the test, showing the position of the periproct. Fig. 2 is an anterior view. Figs. 3 and 4 are side views which give the general proportions of the test and an idea of the nature of the ambulacra and interambulacra. Fig. 5 is an abactinal and Fig. 6 an actinal view.